USDA Forest Service - Southern Research Station - 320 Green Street, Athens GA 30602 - http://www.srs.fs.usda.gov/disturbance

DISTURBANCE AND MANAGEMENT OF SOUTHERN ECOSYSTEMS

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Outreach Activities:

Several organized groups totaling 34 people visited the Brender Demonstration Forest in May. These groups included representatives from the National Weather Service and the Chattahoochee-Oconee Supervisor's Office, looking at the Remote Area Weather Station, and several local families. The three spring turkey hunts on the forest brought in approximately 200 hunters.

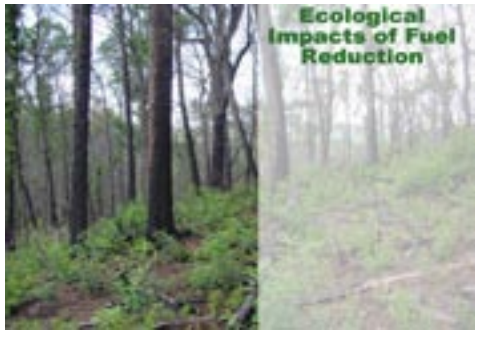
A total of 25 people came by the office for information and 54 people hiked the Hitchiti Interpretive Trail. Some of these visitors came from as far away as Sioux Falls, South Dakota.

A group from the Jones County school system enjoyed the day hiking the Hitchiti trail.

Technology Transfer:

- Ken Outcalt taught the Fire Ecology of Southern Forest portion of the Technical Fire Management School in Seattle, Washington. The course is held annually by the Washington Institute for fire managers in federal agencies.

- Tom Waldrop, Team Leader for Disturbance Ecology in the Southern Appalachian Mountains and Piedmont, was asked to provide an informal briefing to Chief Dale Bosworth on restoring ecosystems with fire and mechanical treatments. Tom was invited to the Chief's office along with Associate Chief Sally Collins, John Stanturf, Acing Director of Vegetation Management and Protection Research, and Sue Conard, National Program Leader for Forest Fire Ecology Research. The discussion centered on two topics: research needs to support the National Forest Systems and the National Fire and Fire Surrogate Study. Prior to the meeting, Waldrop conducted a survey of District Rangers and Fire Management Officers to learn their challenges in using fire and mechanical treatments for restoration. Chief Bosworth was interested to learn that the most common research requests in the South are for smoke prediction, especially in steep terrain, and for basic information on firing techniques and impacts in hardwood systems. Tom answered a number of questions about fire ecology of the Southern Appalachian Mountains. Waldrop also introduced Chief Bosworth and Associate Chief Collins to the National Fire and Fire Surrogate Study. Both were interested in the unique inter-disciplinary approach and the widespread application of the study. The briefing was one of a series of topics selected by the Chief as critical to the Forest Service mission.



Steep Terrain of Appalachian Mountains.

- Scott Goodrick was a guest at a recent meeting in Atlanta of the National Predictive Services Group, an interagency team organized to promote safe, efficient and cost-effective fire management practices. One goal of the group is to strive for continual improvement in the quality, accuracy and relevance of decision support products provided through the various Geographic Area Coordination Centers (GACCs). Scott's attendance helped

Technology Transfer:

inform this group of some the ongoing research of the Southern High Resolution Modeling Consortium as well as provided insight into the needs of the Southern Area Coordination Center and will likely lead to future collaboration.

Wind damage from ~~hurricane~~ on ~~DeSota~~ National Forest ~~from hurricane.~~

- Scott Goodrick participated in the Region 8 Catastrophic Events Workshop held in Asheville, North Carolina. This workshop was designed to develop a handbook for field units to assist in the preparation, management and recovery processes associated with major disasters such as the hurricanes along the Gulf Coast the past couple of years. The handbook is not specific to hurricanes as it is created to deal with all manner of catastrophes.

- Scott Goodrick represented the Southern Research Station on the cross-station team for the Core Fire Science portfolio meeting in Minneapolis to finalize their report to the Fire Strategic Program Area National Team. This document defines core fire science and outlines research priorities designed to enhance our current capabilities in physically describing a fire event and assessing fire potential.

- Gary Achtemeier gave a presentation at the Georgia Air Quality & Climate Summit sponsored by the Air Resources Engineering Center at Georgia Tech. The purpose of the meeting was to bring together Georgia scientists involved in all aspects of air quality research. The title of his talk (co-authored with UGA Professor Luke Naeher) was "Prescribed Burning and Air Quality – What the Forest Community is Doing to Help."

The Smoke Mangement Team is working on the impacts of smoke to our environment.

Technology Transfer:

- Scott Goodrick presented an invited paper, co-authored with Gary Achtemeier and Yongqiang Liu, titled "Southern Smoke Simulation System - A framework for modeling smoke impacts from prescribed burning in the South" at the 15th Annual Emission Inventory Conference sponsored by the Environmental Protection Agency in New Orleans. The presentation outlined the plans of the Smoke Management Team for modeling smoke impacts and addressing some of the underlying uncertainties in modeling smoke from wildland fires. The conference proceedings (including both papers and presentations) are available online at http://www.epa.gov/ttn/chief/conference/ei15/index.html.

- Tom Waldrop provided a tour of some of his team's research to the Governing Board of the Joint Fire Science Program. The tour began in Asheville, North Carolina where the Board was holding a week-long meeting. They traveled to the Green River Gameland (NC Wildlife Resources Commission) where they saw the Southern Appalachian Mountains Site of the National Fire and Fire Surrogate (NFFS) Study and a study site used for Waldrop's work on restoration of Table Mountain pine. Although this particular site of the NFFS was funded by the National Fire Plan, the JFSP Governing Board had never had an opportunity to visit one of the NFFS sites and the design of the study at the Southern Appalachian site is identical to the 11 other sites they funded in 2000. Waldrop presented the changes that occurred to vegetation, soils, fuels, microclimate, fire danger, and insects for 3 years after fuel reduction treatments. Katie Greenberg (SRS Bent Creek) discussed impacts to small mammals, herpetofauna, and birds while Steve Jeffers (Professor of Plant Pathology, Clemson University) discussed disease incidence. Eran Kilpatrick, a graduate student at Clemson University, discussed the national herpetofauna analysis. The Governing Board was interested in the impact of the study on local land management practices. This topic was addressed by Dean Simon of the NC Wildlife Resources Commission, Skip Still of the SC Department of Natural Resources, and Beth Buchanan, Region 8 Fire Ecologist. The group also visited the Table Mountain pine regeneration study site. This specific site was burned every third year over a 12-year period (5 burns). Burning on this site has been too frequent to allow pines to become established. However, understory vegetation and forest floor characteristics are near the desired condition where burning can be ceased and seedlings can become established. Considerable discussion centered on fire-induced mortality of the overstory and different trends that occur in systems across the country.

Technology Transfer:

The Governing Board of the Joint Fire Science Program toured the Southern Appalachian Mountain Site of the National Fire and Fire Surrogate Study on May 18, 2006. The group is joined by NFFS researchers and JFSP staff at a site which had been treated with chainsaw felling of small trees and shrubs followed by two winter prescribed burns. Attending were (front row left to right) Mary Reddan, USDA-FS Forest Supervisor of the Wayne National Forest, Sue Conard, USDA-FS National Program Leader for Forest Fire Ecology Research, Sue Grace, USFWS Fire Ecologist, Becky Jenison, JFSP Program Assistant, Inga McLaughlin, Clemson University Graduate Student, (Second row), Tom Waldrop, USDA-FS SRS Team Leader, Nate Benson, NPS, Erik Berg, JFSP Program Manager, (third row) Eran Kilpatrick, Clemson University Graduate Student, Bud Cribley, BLM Group Manager for Rangeland Resources, Tim Sexton, USDA-FS Fire Use Program Manager, John Laurence, USDA-FS PNW Program Manager for Ecosystem Processes, Katie Greenberg, USDA-FS SRS Research Ecologist, (back row) Paul Langowski, USDA-FS R-2 Branch Chief for Fuels and Fire Ecology, Tim Swedberg, JFSP Technology Transfer Specialist, Jan Van Wagtendonk, USGS Western Ecological Research Center, Skip Still, SC Department of Natural Resources Wildlife Biologist, Dean Simon, NC Wildlife Resources Commission Forest Manager, and Beth Buchanan, USDA-FS R-8 Fire Ecologist. Also attending was Steve Jeffers, Clemson University Professor of Plant Pathology, who took the picture

Technology Transfer:

- Joe O'Brien, Ken Outcalt, Kat Mordecai, and Jim Snyder (USGS) will be hosting two workshops with fire managers in central and south Florida on July 11 and 13th. The focus of the workshops will be to gather the experiences of Florida fire managers on their uses of various hazardous fuels management techniques and evaluate their effectiveness. Managers will also have an opportunity to provide input on what kinds of on hazardous fuels reduction research they would like to see conducted. The July 11th workshop will be held at the Kovens Center at Florida International University and will focus on Pine Rocklands. The July 13th workshop will be held at Bok Tower Gardens in Lake Placid and will focus on pine flatwoods. We expect about 30 attendees at each conference. Details on the workshops can be found on the website: www.srs.fs.usda.gov/ffp. These workshops are part of the effort for the Joint Fire Sciences Program to develop a Best Management Practices manual for pine rocklands.

- Dave Cleland has been invited to participate in a workshop on Workshop on Integrating Ecological Risk Assessment and Economics in Environmental Decision-Making: Fire Management Case Study. Sponsored by the Society for Environmental Toxicology and Chemistry (www.**SETAC**.org) and the Ecological Risk Assessment Advisory Group (http://www.setac.org/**ERAAG**/era_index.htm), the workshop will be held in Racine, Wisconsin in October. The goal for the workshop is to examine principles already developed by the sponsoring organizations to integrate ecological risk assessment with economic analysis in the context of a specific environmental management issue. Fire management was selected as an issue worthy of attention, and because that issue is so broad in scope the Fire Program Analysis system (http://www.fpa.nifc.gov/) will be examined as a focal point. Organizers expect to consider not only the existing capabilities of the FPA system (i.e., optimal resource allocation for initial attack) but also the planned capabilities regarding optimal resource allocation for fuel reduction.

Ken Outcalt erected an outdoor display at the long-term burn study on the Francis Marion National Forest. The display contains general information on prescribed burning in the coastal plain on one side and specific information about the study on the other. A handout fact sheet with a map of the plots and prescribed burning information is provided for visitors.

Technology Transfer:

The high productivity of pine flatwoods results in the rapid accumulation of fuels and a frequent fire regime. Lack of fire causes a rapid buildup of hazardous fuels. Land managers must then use a variety of techniques to enable the safe reintroduction of fire. Pine flatwoods are the dominant upland vegetation type in Florida.

Pine rocklands in Florida have been reduced by more than 90%. Many of the remaining fragments are embedded in urban Miami Dade County. Like pine flatwoods, the moist, tropical climate results in the rapid build up of fuels. Invasion by exotic grasses exacerbates the problem by altering fuels and increasing fire intensity. Our workshop will explore these and other issues facing land managers working to manage fire in these ecosystems.

Outdoor display on demonstatration site on Francis Marion National Forest.

Meetings/Reports:

- John Stanturf attended a meeting of the International Steering Committee of the Global Partnership on Forest Landscape Restoration in Colorado Springs. The meeting was hosted by the Forest Service International Programs Staff and the Pike & San Isabel National Forests (Colorado). The steering committee discussed ways to strengthen the partnership, including development of a new global "learning network" of sites that would facilitate learning about the role of forest landscape restoration in contributing to poverty reduction, quality of life, and biodiversity conservation. The meeting included a one-day field trip focused on landscape-scale restoration work undertaken with partners both before and after the Hayman Fire. The United States is a key member of this global partnership, currently comprised of 25 governments and organizations including the World Conservation Union, World Wildlife Fund International, the International Tropical Timber Organization, the International Union of Forest Research Organizations, and the United Nations Food and Agriculture Organization, who are working together to develop and strengthen forest landscape restoration efforts around the world. Stanturf presented an overview of the upcoming IUFRO Conference on Forest Landscape Restoration, scheduled for 14-18 May 2007 in Seoul, Korea.

- Forest Service Research and Development is conducting a strategic planning study of its high performance computing needs. IRM is providing eGovernment project funds to use with the IRM support contractor to assist in the development of the strategic plan for R&D supercomputing needs. R&D will lead the study with the IRM contractor as facilitator. Ken Forbus is on the Core Team and Scott Goodrick has been invited to participate in the effort. The group will develop reasonable future scenarios and options for management (e.g., centralization vs. decentralized approaches) and provide a strategy that increases the flexibility of R&D to manage supercomputing, lower departmental (USDA) concerns about purchases and maintenance upgrades, and simplify IRM Technical Approval requirements.

- John Stanturf submitted the report of the Integrated Fire and Fuels Management Portfolio Cross Station Team to the Fire Strategic Program Area national leads. The report focused on identifying the key research questions and prioritizing the research elements within the portfolio.

Effects of Biomass Burning on Regional Climate—~~Ynongqiang~~ Liu

The dry and usually hot conditions characteristic of drought mean a bad season for wildfires, and this connection has been recognized for a long time. But what of the reverse connection, that is, do wildfires play a role in regional climate variability? Recent studies of atmospheric ~~aerosol~~ provide both theoretical and observational evidence for the possible importance of wildfires for understanding regional climate. Wildfires emit large amounts of smoke aerosols. By scattering and absorbing solar radiation, smoke aerosols can change atmospheric solar radiation (radiative forcing), which can further change air temperature and humidity and the surface fluxes of heat and water. Thus, clouds and precipitation can be affected by the increased amount of smoke aerosols (Fig.1). So much for theory, is there empirical evidence for this process? We looked at two recent events, 1988 wildfire season in the United States that included the well-known Yellowstone National Park fires, and the 1995 biomass burning season in the Amazon Basin in South America.

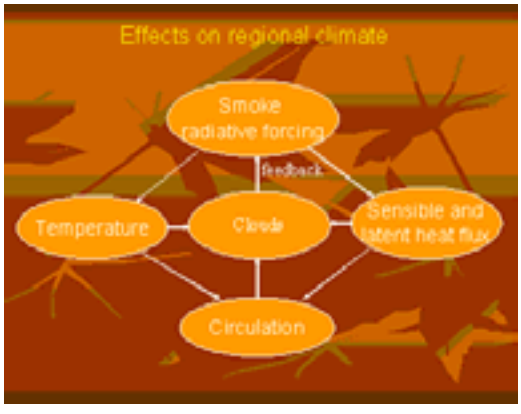


Fig.1 Physical processes of the effects of smoke on the atmosphere

We have ~~studies~~ the regional climate effects of biomass burning using remotely sensed data and simulation modeling. We use a regional climate model (RegCM) developed by the National Center for Atmospheric Research (NCAR) to simulate absorption and reflection of smoke aerosols from wildland fires and the resulting atmospheric perturbations. The optical properties of smoke, including optical depth and scattering albedo, were obtained from field measurements or calculations.

Numerous wildfires broke out in the northern Rocky Mountains in 1988, including the catastrophic Yellowstone National Park fires. At the same time, the northern U.S. experienced a severe drought; it was so severe that is ranks as among the most severe climate anomalies of the 20th century in the continental U.S. The simulation suggested that the wildfires enhanced the drought. The precipitation perturbation (Figure 2) in response to radiative forcing of smoke aerosols is mostly negative in the Northwest, with the largest reduction of about -30 mm found in the northeastern Midwest. Accompanying this were perturbations elsewhere in the country; they were positive in the Southwest, southeastern Midwest, and Northeast, and negative perturbation in the Southeast. The similarity in the spatial patterns between our simulation of the rainfall perturbation due to wildfires and the observed precipitation anomaly were encouraging. Both were negative in the West, Midwest, and the eastern Southeast, and positive in the Southwest and Northeast, suggesting that the atmospheric response to the northern Rocky Mountain wildfires might have been one of the contributing factors for the nationwide precipitation anomalies that occurred during July 1988.

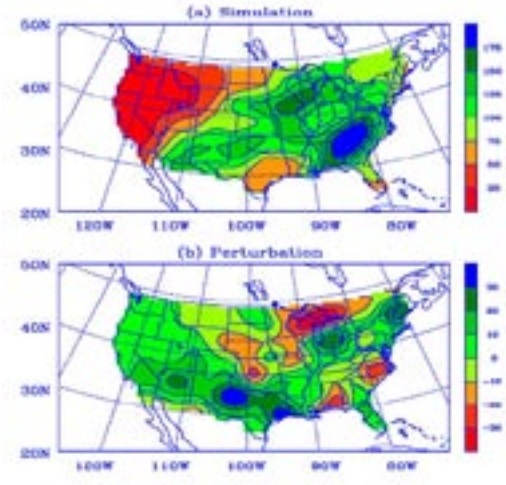
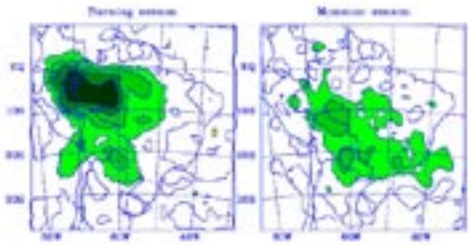


Fig. 2 The simulated precipitation of July 1988 with RegCM (in mm). (a) The simulation without smoke particles. (b) The difference between the simulations with and without smoke particles.

Biomass burning has been used extensively over the past two decades to clear forest and savanna for agriculture in tropical South America. A satellite measurement showed that clouds during a biomass burning season in the Amazon region were reduced by heavy smoke. The simulations of biomass burning in South America obtained a direct radiative forcing of –16.5 Wm-2 over the smoke region. This magnitude, however, is substantially reduced due to atmospheric feedback. Clouds and precipitation are reduced due to smoke, in agreement with recent finding from satellite measurements. The reduction in clouds is caused by less water vapor transport from the ground and from the planetary boundary layer to the cloud layer because of the combined effects of reduced turbulent activity and the subsidence tendency.

Smoke also leads to the enhancement of a dominant planetary-scale high pressure system. A two-layer structure of warmer air with an ascending tendency on top of cooler air with a descending tendency is formed due to smoke with strong absorption. For the first time, our research suggests that biomass burning aerosols, which peaked shortly before the onset of the South American monsoon, may have influenced the development of the monsoon. We determined the smoke aerosol influence by comparing simulations with and without forcing by smoke aerosols for the same period and atmospheric conditions. The comparison suggested that smoke aerosols may strengthen the dry season circulation pattern by stabilizing the lower troposphere – precipitation decreases accordingly. The perturbation signals initially induced by smoke aerosols could last into the subsequent monsoon season (Figure 3). Thus, the effect of smoke aerosols could be to weaken and delay the transition of large-scale circulation



into the monsoon season.

Fig.3 Perturbation in the 500 hPa geopotential height (m) induced by smoke aerosols in 1995, simulated with the NCAR regional climate model.

The mechanisms for the origin and development of regional climate anomalies such as droughts have been an extremely important climate issue over the past decades. Many studies have concluded that anomalies with the internal components of the climate system, such as sea surface temperature, are the major responsible factors for the persistent atmospheric anomalies. Our simulation studies suggest that wildfires could be an external factor of the regional climate anomalies. The benefit of this enhanced understanding of the feedback to the atmosphere of aerosols from wildland fires will be to improve the prediction skill of climate anomalies by including the climate effects of smoke aerosols in predictive climate models.

For more information on these studies, refer to Liu, Enhancement of the 1988 Northern

Science Highlight:

U.S. drought due to wildfires, Geophysical Research Letters, 32 (No. 10), L1080610.1029/2005GL022411; 2005; Liu, Atmospheric response and feedback to radiative forcing from biomass burning in tropical South America, Agricultural and Forest. Meteorology, 133, 40-53, 2005; and Liu, Fu, and Dickinson, Smoke aerosols altering South American monsoon, Bulletin American Meteorological Society, 86(8), 1062-1063, 2005.

Partnerships:

- Dr. Park Yeong Dae of Seoul National University in Korea has applied to spend a year with John Stanturf as a Visiting Scientist, beginning in August. Dr. Park has received a fellowship from the Korea Research Foundation to support his post-doc with the unit. He will be accompanied by his wife Ku Mi Young and infant daughter Seo Yeon. Park completed his PhD under Professor Don Koo Lee, "Ecological studies on rehabilitation of forests degraded by fire or logging in Southern Khenti, Mongolia."

Seoul National University in Korea

Personnel News:

Leanne Morrow is a student at University of Tennessee at Chattanooga. She's been working toward a degree in Environmental Science. She will return to Chattanooga for Fall semester, and plans to graduate in December, whereupon she will make application for graduate school at UGA. She will be working with Mac Callaham this summer.

Funding:

- Mac Callaham and Prof. Kevin Butt, University of Central Lancaster in England, have submitted a proposal to the Royal Society for travel funds to support Mac to do set up research on the Isle of Rum, one of the Hebridean islands, near Eigg in the Small Isles, close to Skye off the coast of Scotland. The objective of the study is to develop models of European earthworm invasion, using the Isle of Rum as a macrocosm of what is occurring in the Northeastern United States.

Photo of Isle of Rum

- Tom Waldrop and Mac Callaham submitted a proposal to the Joint Fire Science Program to re-examine their work on the relationship of fire intensity to overstory mortality and to examine early stand dynamics of young mixtures of pines and hardwoods. Waldrop's previous management recommendations for stand replacement of these communities were based on differences observed one year after prescribed burning. Fires reaching into the crowns of trees were recommended to kill all overstory trees and leave adequate pine regeneration. Cooler fires did not kill overstory trees and hotter fires reduced pine germination. However, measurements taken in one of the original six burn units showed delayed overstory mortality for several years after burning, regardless of fire intensity, and pine seedlings survived. Stand replacement on that unit was achieved with fires of relatively low intensity. Therefore, low intensity fires may be adequate for stand replacement while achieving safety goals. The proposed work would re-measure study plots in all burn units to examine delayed overstory mortality and early stand dynamics in areas burned at each of four fire intensity levels. The proposal, "Low-intensity fires may be adequate for stand replacement of Table Mountain pine (Pinus pungens Lamb.) in the Southern Appalachian Mountains," requests a total of $ $125,000 over three years.

Low intensity fire in Appalachian Mountains.

- John Stanturf received $30,000 from the Washington Office to support FSR&D sponsorship of the IUFRO Forest Landscape Restoration Conference, to be held in Seoul, South Korea next May.

Table Mountain Pine fire line.

Visitors:

- Sven-Olof Lundqvist with STFI-Packforsk AB, Sweden, visited the Forestry Sciences Laboratory to meet with Alex Clark and Dr. Laurie Schimleck, Associate Professor, Warnell School of Forestry Resources, UGA. Mr. Lundqvist is the Project Manager of Optimal Fiber Utilization Research at STFI. He met with Alex and Laurie to learn about the wood quality research being conducted by SRS-4104 and the Wood Quality Consortium and discussed possible future cooperative research.

News from Around the Region:

- The position of Director, Vegetation Management and protection Staff, has opened. The position became open earlier this year when Jim Reaves became Associate Deputy Chief for Research and Development.

- Dr. Kerry Britton has been appointed the National Program Leader for Pathology Research in the Washington Office, a position last filled by Terry Shaw. Kerry was the project leader of the insect and disease work unit in Athens before moving to a staff position with Forest Health Protection in the Washington Office several years ago.

- The new Dean of the School of Natural Resources at North Carolina State University is Dr. Robert (Bob) D. Brown, effective August 1. Brown currently serves as the head of the Department of Wildlife and Fisheries Sciences at Texas A&M University and director of the Institute of Renewable Natural Resources, a coalition that includes wildlife and fisheries sciences; forest science; rangeland ecology and management; and recreation, park and tourism sciences. Brown has a BS from Colorado State University and a Ph.D. in animal nutrition with a minor in physiology from Pennsylvania State University.

- Mr. Jan Erik Heino of Finland is appointed the new Head of the Forestry Department. Mr. Heino has a Master's degree in Forestry and Nature Conservation from Helsinki University and has undertaken post-graduate education in Nordic countries, Germany and Belgium. He is a former Director-General of the Forestry Department of the Ministry of Agriculture of Finland, and currently Director-General of Metsahallitus, the Finnish State Forest Enterprise. He will take up his new appointment on June 29.

News from Around the Region:

- The Bolivian government announced plans to nationalize land, timber, silver, and water resources, while redistributing idle land to poor peasants. The announcement follows nationalization of the country's energy industry President Evo Morales leftist government. In 1994, the Bolivian government and the United States Agency for International Development formed a joint project called BOLFOR, aimed at promoting Forest Stewardship Council (FSC) certification to help sustain the country's forests. Bolivia now has more FSC forests than any other tropical country. (Source: Reuters)

- Plum Creek, the largest and most geographically diverse private landowner in the nation, recently increased its estimate of timberlands with higher-value alternative uses by approximately 400,000 acres to 1.7 million acres. These lands are expected to be sold over time for recreation, development, or conservation purposes. The company's current assessment includes 6.1 million acres of core timberlands located in excellent long-term timber markets and 420,000 acres of non-strategic timberlands that do not fit the core timberland criteria. The company's current assessment of timberlands with higher values includes approximately 975,000 acres of recreation lands, 225,000 acres of lands suitable for responsible development, and approximately 500,000 acres of conservation properties. (Source: BusinessWire)

Huber plant outside of Commerce, GA.

- Huber Engineered Woods LLC, a wholly-owned subsidiary of the J.M. Huber Corporation, plans to expand its oriented strand board (OSB) business in Emanuel County, Georgia. The new Greenfield oriented strand board plant should be a capital investment in excess of $200 million and provide up to 150 new jobs to Emanuel County and surrounding communities. Once approved, the project is slated for startup in 2008 and will have an annual production capacity in excess of 650 million square feet once fully operational. Huber Engineered Woods LLC, a wholly owned subsidiary of J.M. Huber Corporation, produces oriented strand products for the residential construction market with manufacturing operations in Maine, Georgia, Virginia, Tennessee and Oklahoma. It manufactures specialty engineered panels and wood products that are used in residential applications such as floors, walls and roofs. Huber Engineered Woods LLC also serves industrial markets with products for door manufacturers and the transportation industry. (Source: BusinessWire)

- FAO Assistant Director-General for the Sustainable Development Department Alexander Müller recently speculated that biofuels could provide a full 25 % of the world's energy needs within 20 years. Momentum is gathering for a switch from fossil fuels to renewable bioenergy, under the pressure of soaring oil prices and growing environmental constraints, according to FAO. Besides oil at $70 a barrel, other factors pushing for such a momentous change include environmental constraints – increased global warming and the Kyoto Protocol's curbs on emissions of carbon dioxide and other greenhouse gasses – and a growing perception by governments of the risks of dependence on oil. His view is shared by a growing number of investors, including Bill Gates, who recently decided to finance a US ethanol company to the tune of $84 million. Other new entries in the field are a French company hitherto better known for making foie gras, and Hungary, which plans to turn one million hectares of farmland over to biofuel crops in the next few years. (Source: FAO)

Publications

FY 2006 Publications (* denotes new publication this month)
Refereed Journals and Book Chapters

*Brose, P.H. and **Waldrop, T. A**. 2006. Fire and the origin of Table Mountain pine – pitch pine communities in the southern Appalachian Mountains, USA. Canadian Journal of Forest Research 36: 710-718

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Schoenholtz, S.H., **Stanturf, J.A**., Allen, J.A., Schweitzer, C.J. 2005. Afforestation of agricultural lands in the Lower Mississippi Alluvial Valley: The state of our understanding. pp. 413-432. In L.H. Fredrickson, S.L. King, and R. M. Kaminski, eds. *Ecology and Management of Bottomland Hardwood Systems: The State of our Understanding.* University of Missouri-Columbia. Gaylord Memorial Laboratory Special Publication No. 10. Puxico, MO.

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Other Publications

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Outcalt, K.W. 2005. Prescribed Burning Research on the Hitchiti Experimental Forest. Demonstration Forest Project Hitchiti Experiment Forest, Jarrell, GA. [Information Card]

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Outcalt, K.W. 2005. We can't keep fire out of these woods. We can only choose between prescribed burns or wildfire. Demonstration Forest Project Osecola National Forest, Olustee, FL. [Outdoor Display]

Outcalt, K.W. 2005. We can't keep fire out of these woods. We can only choose between prescribed burns or wildfire. Demonstration Forest Project Osecola National Forest, Olustee, FL. [Information Card]

Outcalt, K.W. 2005. Fire and Fire Surrogate Study in the Gulf Coastal Plain. October 2005 Solon Dixon Forestry and Education Center, Andalusia, AL [Bookmark]

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Abstracts and Posters

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Achtemeier, Gary L. 2005. On plume rise – matching Daysmoke with Briggs Equations for industrial stacks. Sixth Symposium on Fire & Forest Meteorology and the 19th Interior West Fire Council Meeting, October 25-27, Canmore, Alberta, Canada. Sponsored by the American Meteorological Society [Abstract]

Alahari, N., Sublette, K., Jennings, E., Thoma, G., Wolf, D., Duncan, K., **Callaham, M. Jr.**, Todd, T. 2005. Earthworms as ecoengineers in the restoration of oil and brine impacted soils following remediation. International Petroleum Environmental Conference, November 2005, Houston, Texas [Abstract]

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Publications

Callaham, M.A. Jr., Todd, T.C., Kitchen, D.J., Blair, J.M., Williams, M.A., Rice, C.W. 2005. Long-term studies on soils and soil biology in a Kansas tallgrass prairie: Stories that only time can tell. Invited symposium presentation at the Soil Science Society of America Annual Meeting, 6-10 November, Salt Lake City, Utah [Abstract]

Camp, D.L., S.R. Bennett, M.A. Callaham, Jr., and P.F. Hendrix. 2006. Native and exotic earthworm effects on C and N dynamics in a growth chamber experiment. Poster Presentation at 12th Annual Ecology Student Symposium at the University of Georgia, Institute of Ecology, Athens, GA. [Published abstract]

Canfield, J.M., Linn, R, Cunningham, P., **Goodrick, S.L.** 2005. Modeling effects of atmospheric stability on wildfire behavior. Sixth Symposium on Fire & Forest Meteorology and the 19th Interior West Fire Council Meeting, October 25-27, Canmore, Alberta, Canada. Sponsored by the American Meteorological Society [Abstract]

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Giai, C., **Callaham, M.A. Jr.,** and Boerner, R.E.J. 2006. A mechanistic approach to determining why fire and thinning affect soil organic matter and nutrient status in Appalachian oak forests. Central Hardwoods Forest Conference, February 27-March 1 2006, Knoxville, TN [Poster]

Goodrick, S.L. 2005. Building historical gridded weather data sets for fire program analysis. Sixth Symposium on Fire & Forest Meteorology and the 19th Interior West Fire Council Meeting, October 25-27, Canmore, Alberta, Canada. Sponsored by the American Meteorological Society [Poster]

Goodrick, S.L., Cunningham, P. 2005. A mechanism for the formation of transverse horizontal vortices on wildland fires. Sixth Symposium on Fire & Forest Meteorology and the 19th Interior West Fire Council Meeting, October 25-27, Canmore, Alberta, Canada. Sponsored by the American Meteorological Society [Abstract]

Goodrick, S.L., Hanley, D.E. 2005. Atmospheric teleconnections and wildfires in the southeastern United States. Sixth Symposium on Fire & Forest Meteorology and the 19th Interior West Fire Council Meeting, October 25-27, Canmore, Alberta, Canada. Sponsored by the American Meteorological Society [Poster]

Hanley, D.E., Cunningham, P**., Goodrick, S.L.** 2005. The interaction between a wildfire and a sea-breeze front. Sixth Symposium on Fire & Forest Meteorology and the 19th Interior West Fire Council Meeting, October 25-27, Canmore, Alberta, Canada. Sponsored by the American Meteorological Society [Poster]

Linn, R.R., Canfield, J., Winterkamp, J., Cunningham, P., Colman, J., Edminster, C**., Goodrick, S.L.** 2005. Numerical simulations of fires similar to those of the international crown fire modeling experiment. Sixth Symposium on Fire & Forest Meteorology and the 19th Interior West Fire Council Meeting, October 25-27, Canmore, Alberta, Canada. Sponsored by the American Meteorological Society [Abstract]

Liu, Y.-Q., G. Achtemeier and S. Goodrick. 2005. CMAQ-Daysmoke as a Smoke and Air Quality Management Technique: A Case Study of a Prescribed Burning in Georgia. In: Proceedings Sixth Fire and Forest Meteorology Symposium, October 25-27, Canmore, AB, Canada [Abstract]

Photos from the Masthead: Frogs from around Georgia

American Toad
Bufo americanus

Bird Voiced Tree Frog
Hyla avivoca

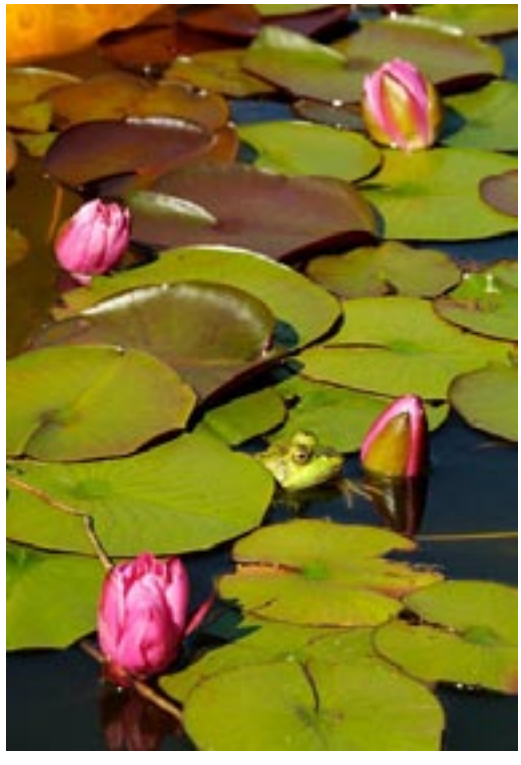
Bullfrog
Rana catesbieana

Green Tree Frog
Hyla cinerea

Barking Tree Frog
Hyla gratiosa

Pine Barrens Tree Frog
Hyla andersonii

Southern Leopard Frog
Rana sphenocephala



Upcoming Events:

2006

Jun 3-8	12th International Symposium on Society and Natural Resource Management, Vancouver, BC, Canada; http://www.issrm2006.rem.sfu.ca
Jun 5-9	Fourth International Poplar Symposium, "Meeting the Needs of a Growing World through Poplar and Willow Science: Combining Traditional and Novel Approaches in the Genomic Era," Nanjing, China, IUFRO Poplar and Willow Working Party 2.08.04; http://ips2006.njfu.edu.cn/
*Jun 6-8	Landfire Meeting, Tallahassee, FL. Outcalt to attend
Jun 13-15	Forest Service National Invasive Species Conference, Denver, Colorado; http://fsweb.wo.fs.fed.us/invasivespecies/events/conference2006/index.shtml
*Jun 25-29	Annual Meetings of The Society of Wood Science and Technology and the Forest Products Society, Newport Beach, CA. Alex Clark will attend and present
Jun 26-28	AWRA 2006 Summer Specialty Conference, Adaptive Management of Water Resources; Missoula, MT; http://www.awra.org/meetings/Montana2006/index.html
*Jun 28-29	Landfire Meeting, Wilmington, NC. Outcalt to attend and present.
Jul 9-15	18th World Congress of Soil Science, in Philadelphia, PA http://www.18wcss.org
*Jul 11, 13	Fuels Management Workshops in Florida. Outcalt & O'Brien to conduct.
*Jul 18	Wood Quality Consortium, UGA, Athens, GA. Clark to attend and present.
*Jul 18	14th Biennial Southern Silvicultural Research Conference Planning Committee Meeting, Athens, GA. Stanturf, Breland & K. Outcalt to attend
Jul 18-20	Advances in Threat Assessment and Their Application to Forest and Rangeland Management, Boulder, Colorado; http://www.forestencyclopedia.net/encyclopedia/threats
*Jul 25-26	Workshop for Cumulative Watershed Effects of Fuel Management, Atlanta, GA. Outcalt to attend.
Aug 2-4	Southern Regional Conference on Forestry Technology Transfer and Science Delivery, Little Rock, Arkansas; http://sref.info/2006/techtransfer
Aug 6-11	Eighth International Conference on Mercury as a Global Pollutant Madison, WI; http://www.mercury2006.org/ ; DiCosty to attend and present paper
Aug 6-11	Ecological Society of America annual meeting, Memphis, TN; http://www.esa.org/memphis/
Aug 8-10	Forest and Water in a Changing Environment Beijing, China; Chinese Academy of Forestry, Beijing Forestry University and Southern Research Station.
Aug 22-25	5th European Conference on Ecological Restoration: "Land use changes in Europe as a challenge for restoration ecological, economical and ethical dimensions" University of Greifswald, Germany http://www.uni-greifswald.de/SER2006
Aug 28-Sep 1	IEA Bioenergy Task 29, Task 31 and Task 39, International Workshop "Biofuels and Bioenergy: Challenges and Opportunities," University of British Columbia, Vancouver Canada; http://www.ieabioenergytask31.org/
Sep 11-14	Baltic-Scandinavian Disturbance Network annual meeting, Tromsø, Norway with field excursions to Lapland in Finland (Alta, Lakselv and Kilpisjärvi); http://www.eau.ee/~ecosyst/index.php?page=coming
*Sep 24-26	SESAF Meeting, Auburn, AL
Sep 25-28	2006 biennial meeting Short Rotation Woody Crops Operations Working Group, Red Lion Inn, Pasco, Washington; tentatively, joint meeting with Poplar Council of Canada, US Poplar Council, IUFRO Temperate Short Rotation Forestry Working Party 1.03.02, and SAF Agroforestry Working Group;
Sep 25-27	UFRO Oak Silviculture Working Party (1.06) meeting, Stevens Point, WI; optional pre-conference field trip to SW WI on Sept 21-23, and optional post-conference tour to northern WI on Sept 28-30.
Sep 26-19	Patterns and Processes in Forest Landscapes; Consequences of Human Management, University of Bari, Italy; IUFRO 8.01.03 Landscape Ecology; http://www.greenlab.uniba.it/events/iufro2006/
Oct 4-7	IUFRO and EFI International Meeting, "Ecosystem Goods and Services from Planted Forests," Bilbao, Spain; http://www.iefc.net
Oct 10-13	Conference on "Sustainable Forest Management with Fast Growing Plantations", Charleston, SC; contact Dave Wear dwear@fs.fed.us
Oct 25-29	Society American Foresters Annual Meeting, Pittsburgh, PA
Oct 23-27	Knowledge management in forestry conference, sponsored by KnowForAlp, hosted by Forest Research Institute Baden Württemberg, Freiburg, Germany
*Nov 7-9	2nd National Experimental Forest and Range Workshop, Bent Creek Experimental Forest, Asheville, North Carolina
Nov 8-9	National Agenda 2020 Forest Productivity and Technology Workshop, Washington, DC
Nov 12-16	Soil Science Society of American Annual Meeting, Indianapolis, IN; http://www.indy.org
Nov 13-17	3rd International Fire Ecology and Management Congress, San Diego, CA; http://emmps.wsu.edu/firecongress/
Nov 14-16	SRS Management Team Meeting, joint with Region 8; Atlanta.

2007

Feb 26-Mar 1	14th Biennial Southern Silvicultural Research Conference, Athens, GA;
*Apr 18-19	IUFRO conference Leading Forestry Research in an Era of Globalization (tentative title); Washington, DC

Upcoming Events:

May 13-17	4th International Wildland Fire Conference, Sevilla, Spain; http://www.fire.uni-freiburg.de/course/meeting/2007/meet2007_01.htm
May 14-18	IUFRO Forest Landscape Restoration Conference, Seoul, South Korea; venue is COEX in Seoul; http://www.coex.co.kr/
*May?	North American Forest Biology Workshop, hosted by the Hard wood Tree Improvement and Regeneration Center, Purdue University; http://www.agriculture.purdue.edu/fnr/HTIRC/
*Jun 6-8	EastFire II Conference, George Mason University, Fairfax, VA; http://eastfire.gmu.edu/temp/eastfirewatch/conference.htm
Summer	6th North American Forest Ecology Workshop, to be held in British Columbia
Oct 24-28	Society American Foresters Annual Meeting, Portland, OR.
Nov 4-8	Soil Science Society of American A Annual Meeting, New Orleans, LA; http://www.neworleanscvb.com
2008	
Nov 5-9	Society American Foresters Annual Meeting, Reno, NV.
2009	
	World Forestry Congress, Buenos Aires, Argentina

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GPRA -Accomplishment

Category	FY 2004 Total	FY 2005 Total	FY 2006 To Date
Number of Refereed Journal Publications	20	21	20
Number of Non-Refereed Publications (include abstracts)	89	60	38
Number of Publications (refereed + non-refereed)	109	81	58
Number of Tours	41	40	29
Number of Short Courses/Training	20	13	21
Number of Invited Presentations to Scientific Organizations	12	7	18
Number of Invited Presentation to Lay Organizations	30	32	24
Volunteer Presentations to Scientific Organizations (non-GPRA	42	50	19
Number of Technology Transfer Activities (other than above)	105	132	76
Outside Funding	$2,610,574	$3,688,734	$1,882,253

SRS-4104 Project Leader's Report

John Stanturf - Editor Lynne Breland - Technical Writer
Patricia A. Outcalt - Production, Design and Layout

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